

yet to be collected and discussed, and about which I will not now speak. Suffice it to say that such inquiries as I have made confirm, so far as they go, the reasonable expectation that some more or less regular curve will be found to exist in respect to any given quality or group of qualities. Each individual would possess his own characteristic curve, but the average of the tastes of many individuals would, as all statistical experience justifies us in believing, afford fairly constant data. These would enable us to argue out the hypothesis I have submitted, with mathematical precision ; at all events, with much more closeness of reasoning than is now possible. But this much may even now be averred : (1) That the existence of a law of sexual selection such as I have described, is probable ; (2) if it exists, it would have a powerful influence in rounding off any incipient variety that differed notably in any one particular or in any group of particulars from the parent stock ; (3) it would be favourable to the vigour of the variety, after it was once fairly started, by checking too close interbreeding.

It must be borne in mind that differences overlooked by ourselves, who are singularly deficient in the sense of smell, and who are hardly able to distinguish without scrutiny even the sexes of some animals, may seem very considerable to the animals themselves. Also that the only differences that we are able to recognise between two varieties may connote a host of unseen differences, whose aggregate would amply suffice to erect a barrier of sexual indifference or even repugnance between their members.

FRANCIS GALTON

August 23

NOTES

THE Local Committee of the Birmingham meeting of the British Association has issued a descriptive programme of the excursions which have been arranged for Saturday, September 4, and Thursday, September 9. The programme covers 120 pages, and has been compiled by several specialists with the greatest care. There are twenty-seven excursions in all, besides a geological excursion to the Lower Palæozoic district of Shropshire. This excursion will last six days, from September 9 to September 15. Prof. Lapworth will take the leadership.

THE French Association for the Advancement of Science has concluded its annual meeting at Nancy, after having resolved that the 1888 session will be held in Oran, Algeria ; Col. Laussedat has been elected President for that meeting. The 1887 session will be held in Toulouse, as decided at the last meeting.

At the Buffalo meeting of the American Association it was proposed to devote especial attention to the study and discussion of the interesting phenomena of the Niagara Falls and the gorge below. On Friday, August 20, one or more preliminary papers of an expository and suggestive nature were to be given, intended to prepare the way for a short field-study of the Falls and the gorge, which occupied Saturday. Monday forenoon would be devoted to the discussion of the gorge and the problems to which it gives rise. A new survey of the Falls has been arranged for, so that a considerable addition to the data for the computation of the rate of recession will be at command, and it is expected that new observations in other important lines bearing upon the chronology of the gorge will be presented, and will throw fresh light upon the history of the formation and recession of the Falls, and upon the utility or untrustworthiness of the gorge as a geological measure of time.

WE learn that the Lick Trustees—after a most thorough discussion of the various plans and specifications submitted for the mounting of the 36-inch refractor of the Lick Observatory and for the steel dome to cover the same, and with a special con-

sideration of the element of time, which circumstances now make one of vital interest to the work—have let the contract for the former to Warner and Swasey of Cleveland, Ohio, for 42,000 dols., and the contract for the latter to the Union Iron-Works of San Francisco for 56,850 dols. The Trustees acknowledge the very prompt and courteous manner in which Mr. Grubb has responded to their invitation, and the very great disadvantage to which he has been put by the remote situation of his works from California, &c. The President of the Trustees has stated that he believes that Mr. Grubb's idea of an elevating floor in principle offers the best solution yet submitted of the very difficult problem of a convenient chair for the observer with so large a telescope. The method of elevating the floor will have to be adapted to the peculiar circumstances of the site of the Lick Observatory, and the means to be commanded there with its very limited water-supply. This subject is now being carefully studied, and so far the only apparent obstacle to the adoption of Mr. Grubb's plan is the question of cost.

WE have to record the death, at Tomsk, of Alexander Krapotkin, on August 6, at the age of forty-five years. M. Krapotkin had done some good work for science in Russia. He had translated into Russian Mr. Herbert Spencer's "Principles of Biology," and Clerk-Maxwell's "Theory of Heat," and for several years contributed to Russian periodicals reviews of the progress of physical astronomy, much valued by Russian astronomers. In 1874 M. Krapotkin was exiled to Minusinsk in East Siberia, and there he helped Dr. Martianoff to organise a local museum ; and for several years carried on meteorological observations, which were printed by the Kazan Society of Naturalists. His most important work, however, was a critical investigation of all our present knowledge of the stellar systems and constitution of stellar groups. Every known source in every European language was ransacked for data, though the difficulties he encountered in his peculiar position prevented him from bringing his work down to a later date than 1879. He hoped to complete the work, and publish it, after his expected liberation in September. His untimely death has put an end to this hope.

WE have received the third number of the *Journal* of a Society recently founded in Bombay, called the Natural History Society of Bombay, which, though it is young, appears to have abundant vitality. There are already several learned societies in India and Ceylon, all of which appear to be very successful ; but the field is so vast and varied, and the number of men, servants of the Crown and others, capable of doing good work is so great, that it is impossible to have too many of these associations, and accordingly we welcome the new Society, and are glad to notice the energy it displays. In the number of the *Journal* before us, Capt. Becher describes the life (mainly the bird-life) of a Sind lake, Manchar, near the Indus ; "A member of the Society" similarly compiles some notes on animal life in the rivers of British Deccan and Kandesh. Mr. Sterndale, one of the editors, has a paper, with illustrations, on abnormalities in the horns of ruminants, in which he expresses the opinion that there is neither persistence nor transmission in the abnormalities of antlered deer, but that they must be persistent in the case of hollow-horned ruminants, and that in the latter case the adage is true : "As the twig is bent, so is the tree inclined." Mr. Aitken, the second editor, publishes a list of the Bombay butterflies in the Society's collection, with notes. The collection appears to be far from complete in any direction. Dr. Kirtikar describes a new species of Alga (*Confervula thermalis Birdwoodii*), discovered among the hot-water Algae in the hot springs of Vajrabai. There are, in conclusion, various zoological and botanical notes, and a list of presentations to the Society, which we notice in order to mention that they appear to be of great number and variety. One present is a collection of 105

birds. The new Society evidently has many friends and supporters.

AMONGST the great number of publications which are received from time to time from the Smithsonian Institution, two which have lately been issued help better perhaps than anything else to show the magnitude of the work of the Institution as a disseminator of scientific knowledge—a work, moreover, the sphere of which is limited only by the civilised world. The first of these is the list of institutions in the United States receiving the Smithsonian publications. The latter "are so distributed as to be accessible to the greatest number of readers," and the rules for distribution are accordingly of a very elastic kind, giving abundant discretion to the authorities. The publications are divided into three classes: (1) the reports; (2) the miscellaneous collections; (2) the contributions to knowledge. Of these, one, two, or all classes are distributed according to the demands of the neighbourhood to which they are sent, and all that is required in return is that they be "duly acknowledged, be carefully preserved, be accessible to any person who may wish to consult them, and be returned to the Smithsonian Institution in case the establishment at any time ceases to exist." The list of institutions in the United States receiving the publications under these conditions fills a pamphlet of about seventy pages, and numbers nearly 2000. They include various classes of schools and colleges, literary and scientific institutes, learned societies, public libraries, hospitals, &c., in wonderful variety. In looking through the list it is impossible not to recollect the trouble with which a few of our own public institutions succeeded last year in getting some of the Parliamentary papers published by the Government.

THE second publication to which we have alluded is the Smithsonian list of foreign correspondents, in other words, of institutions outside the United States to which the Institute's publications are sent. These reach the enormous number of 7969, every country on the globe with any pretence to civilisation being represented. It thus appears that an ordinary Smithsonian Report has a free circulation of about 10,000, and is spread all over the globe, from Pekin to Valparaiso, from Iceland to New Zealand. The exchange department of the Smithsonian is certainly not the least marvellous part of a marvellous institution.

ACCORDING to the latest consular report from Newchwang, in Manchuria, Seoul, the capital of Corea, is now in telegraphic communication with Pekin, and so with the outer world. The line runs through Moukden. Six years ago no European was allowed to visit Corea, and those who ventured to disregard Corean seclusion generally paid for their temerity with their lives: to-day a merchant in London might telegraph direct to the capital of the Hermit Kingdom.

A SHOCK of earthquake was experienced on Friday evening at Kilsyth, a mining town situated in Stirlingshire, about thirteen miles from Glasgow. About 9 o'clock a sharp rumbling noise of a few moments' duration was heard over the greater part of the town. Much vibration was noticed in many houses at the same time. People ran immediately into the streets, not knowing what had occurred, and many rushed off to the Craig Ends and Haugh pits, situated to the east and west of the town, thinking that one or the other must have been the scene of a great disaster. The shock was most distinctly felt in the north-east portion of the burgh. The weather at the time was close and dull.

ANOTHER slight shock of earthquake was felt at Malta at 8.30 a.m. on August 19. The captain of a steamer which arrived there on the 18th, officially reports that at about 9 o'clock on the evening of the 17th inst. he observed

something like a blaze of fire coming out of the water. It was about 30 feet wide and rose to 100 feet above the water, and disappeared at once. The position of the steamer at the time was about 200 miles eastward of Malta. The blaze was observed at the head of the ship, and those on board were certain that it was not lightning.

A CURIOUS result of the volcanic eruption in New Zealand (according to the *Colonies and India*) is alleged to have been found in the sudden breaking up of the drought in Australia. It is said that the great Java earthquake of 1883 was the immediate forerunner of a long spell of dry weather in Queensland in that year, and that a welcome fall of rain in the same colony followed immediately upon the eruption of Mount Tarawera.

MR. F. W. PUTNAM'S last report of the explorations which he is conducting with Dr. Metz in Ohio for the Peabody Museum, deals with what is called the Marriott Mound, No. 1, forming part of the Turner group in the Little Miami Valley. The report describes with great minuteness the various objects found in this mound, of which numerous illustrations are given. The find was a rich one. The mound, though it had been ploughed over, was 2 feet high and 60 feet in diameter at the time of the examination. In the centre was found a mass of burnt clay in the shape of a basin, 2 feet in diameter, containing ashes, charcoal, burnt bones, pottery beads, and various shells used as ornaments. About 600 fragments of pottery, from 2000 to 3000 broken and split pieces of bones of animals (chiefly the deer and bear), shells of river clams, several objects in bone and stone, and some human remains, were amongst the objects found in the mound. Of the latter the principal were a perforated skull, various bones belonging to a different skeleton, a third skeleton, partly covered by a large hammered copper plate, and a fourth, which was apparently that of a woman, with numerous personal ornaments near it. Mr. Putnam's report is confined to a bare description of all these and other objects found, and of their precise situations in the mound with regard to the basin in the centre and to each other.

AT the annual meeting of the Royal Society of Queensland, held at Brisbane on July 2, the President, Mr. L. A. Bernays, delivered an address in which he gave a brief *résumé* of the work of the Society during the past year, its meetings, and the publication of the papers read on these occasions, the endeavour to assist in the exploration of New Guinea by organising a fund for the benefit of the Forbes Expedition; the efforts to encourage special scientific pursuits amongst the members by the admission of Sections into its constitution. Finally, having dwelt on the importance of the conduct by the State of systematic instruction with the immediate object of fostering numerous industries which the marvellous range of soil and climate of the colony is capable of calling into existence, occasion was found to dwell on the value of technical and industrial botany, and the importance of its recognition in the plan and management of the colonial botanical gardens, and in the selection generally of objects publicly displayed for educational purposes. With regard to the Forbes Exploration Fund referred to by the President of the Queensland Royal Society, in December last Mr. H. Tryon suggested to the Council of the Society that such a fund should be opened in Queensland. This was done, and at the time it was closed 94*l.* was raised. Subsequently a further appeal was received on behalf of Mr. Forbes, whose operations had been suspended. This led to the fund being reopened, with the result of additional subscriptions being received, raising the total to 145*l.* 10*s.* For a Society which is quite young, and the total income of which is but little over 100*l.* per annum, this is a considerable donation to Mr. Forbes's work, even though Queensland has a special interest in New Guinea.

THE additions to the Zoological Society's Gardens during the past week include an Egyptian Gazelle (*Gazella dorcas*) from Egypt, presented by Capt. Robbins; two Red-under-winged Doves (*Leptopila rufaxilla*) from Guiana, presented by Mr. S. Wells; a Barn Owl (*Strix flammea*), British, presented by Sir Henry Tyler; two Great Eagle Owls (*Bubo maximus*), bred in Shropshire, presented by Viscount Hill; three Yellow-headed Conures (*Conurus jendaya*) from South-East Brazil, presented by Mr. C. Rudge; a Raven (*Corvus corax*), British, presented by Mrs. Tatham; a Martinique Gallinule (*Porphyrio martinicus*) from South America, presented by Mr. J. M. Booker; two Common Boas (*Boa constrictor*) from South America, presented by Mr. T. H. Church; a Common Viper (*Vipera berus*), British, presented by Mr. R. B. Spalding; four Ruscon's Newts (*Molge rusconi*) from Sardinia, presented by Prof. H. II. Giglioli, C.M.Z.S.; two Black-eared Marmosets (*Hapale penicillata*), a Feline Douroucouli (*Nyctipithecus vociferans*), two Yarrell's Curassows (*Crax carunculata*), two Magpie Tanagers (*Cissopis leveriana*), two Ariel Toucans (*Ramphastos ariel*), two Laughing Gulls (*Larus atricilla*), a White-faced Tree-Duck (*Dendrocygna viduata*) from South-East Brazil, purchased; three Aldrovandis Skinks (*Plestiodon auratus*) from North-West Africa, two Common Slow-worms (*Anguis fragilis*), British, received in exchange; six Ribbon Snakes (*Tropidonotus saurita*), born in the Gardens.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 AUGUST 29—SEPTEMBER 4

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on August 29

Sun rises, 5h. 9m.; souths, 12h. om. 46° 9s.; sets, 18h. 52m.; decl. on meridian, 9° 18' N.: Sidereal Time at Sunset, 17h. 24m.
Moon (New) rises, 4h. 51m.; souths, 11h. 58m.; sets, 18h. 52m.; decl. on meridian, 9° 21' N.

Planet	Rises	. Souths	Sets	Decl. on meridian
	h. m.	h. m.	h. m.	
Mercury	3 37	10 54	18 11	14 4 N.
Venus	2 48	10 27	18 6	17 51 N.
Mars	10 45	15 38	20 31	13 40 S.
Jupiter	8 5	13 59	19 53	2 0 S.
Saturn	0 46	8 51	16 57	21 47 N.

Occultation of Star by the Moon (visible at Greenwich)

Sept.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image	
					h. m.	h. m.
3	γ Librae	... 4 $\frac{1}{2}$	21 19	22 13	143 273	0 0

August 29.—Total eclipse of Sun: not visible in Europe. The central line crosses the West Indies, the Atlantic, and Southern Africa. The members of the British Expedition are prepared to observe the eclipse at Grenada, one of the Windward Isles, where the eclipse will occur soon after sunrise, having a duration of totality of about 4 minutes. In mid-Atlantic the duration will be 6 minutes. In Africa the eclipse occurs near to sunset, with a duration of totality of about 4 minutes.

Sept. h.
2 ... 11 ... Mercury at greatest elongation from the Sun, 18° west.

Variable Stars

Star	R.A.	Decl.	
	h. m.		h. m.
U Cephei	0 52' 2	8 $\frac{1}{2}$ 16 N.	Sept. 1, 20 27 m
U Ophiuchi	17 10' 8	1 20 N.	,, 2, 1 22 m
			21 30 m
W Sagittarii	17 57' 8	29 35 S.	, 2, 0 0 m
T Serpentis	18 23' 3	6 13 N.	, 4, M
η Aquilæ	19 46' 7	0 43 N.	Aug. 29, 21 0 M
R Vulpeculae	20 59' 3	23 22 N.	Sept. 3, m

M signifies maximum; m minimum.

Meteor Showers

Amongst the radiants that have been observed at this season are the following:—Near γ Pegasi, R.A. 6°, Decl. 11° N.; near ψ Cygni, R.A. 30°, Decl. 54° N.; near λ Cygni, R.A. 311°, Decl. 35° N.; near ε Cephei, R.A. 335°, Decl. 52° N.; and near β Piscium, R.A. 345°, Decl. 0°. Fireballs are of frequent occurrence during this week.

Stars with Remarkable Spectra

Name of Star	R.A. 1886°	Decl. 1886°	Type of spectrum
	h. m. s.		
71 Pegasi	23 27 46	21 52' 3 N.	III.
19 Piscium	23 40 34	2 51' 3 N.	IV.
φ Pegasi	23 46 41	18 29' 2 N.	III.
D. M. — 0° 4585	23 48 55	0 31' 6 S.	III.
30 Piscium	23 56 7	6 38' 9 S.	III.
47 Piscium	0 22 6	17 15' 6 N.	III.
57 Piscium	0 40 34	14 51' 2 N.	III.
7 Schjellerup	1 9 49	25 9' 9 N.	IV.
R Piscium	1 24 45	2 17' 6 N.	III.

GEOGRAPHICAL NOTES

In a lecture delivered at Cooktown (published in the *Daily Observer* of Brisbane), Mr. H. O. Forbes described his work in New Guinea during the six months he remained there. He set up his winter camp at Sogere, three days' march from the coast, though only 25 miles in a straight line, on the slope of a steep mountain. His work here was varied and important. The meteorological station which was erected was placed under the charge of Mr. Hennessy, and the observations were continued down to the end of his stay. These consisted of records of the merciful barometer, maximum and minimum, dry- and wet-bulb thermometers, and rainfall, and were recorded without interruption six times in every twenty-four hours. The mass of observations thus accumulated will take a considerable time to tabulate, especially those referring to the atmospheric humidity. Then there was the collecting of zoological and botanical specimens. A large portion of the herbarium consists of giant trees of the forest. It contains about one thousand specimens, one set having been sent to Baron von Müller to Melbourne. A great part of Mr. Forbes's own time was devoted to the survey and delineation of the geographical features of the country. He obtained angles from about fifty different stations and established a base of several miles in length, on which he had hoped to found the triangulation of the country between Sogere and Owen Stanley, and the north-east coast. He also paid a visit to the latter place, and there, as elsewhere, with a little management, found the natives extremely friendly and well-disposed. When Mr. Forbes found his funds failing, he determined, with Mr. Chalmers, on making a dash for Mount Owen Stanley, but the natives who were to have aided him fled in the night, apparently on account of the terrors inspired by the journey. He only got as far as Kaukari, a village two days' journey beyond Sogere. He says that no words can give a true idea of the break-neck, shattered, disrupted condition of the country between Sogere and the central ridges. Beyond the natural obstacles, however (and they appear to be very great), there appears no reason why British New Guinea should not be thoroughly explored, provided the natives are treated with conciliation and tact.

THE Hon. Duncan Gillies, Premier of Victoria, has received a deputation, consisting of members of various learned societies, who urged the expediency of Antarctic exploration. The deputation represented that whale-fishing would make the enterprise remunerative, but at the same time asked the Victorian Government to give encouragement to the project. The Premier, in reply, said that the Government would be willing to grant a subsidy to aid scientific discovery, and that he would ask the other colonies to do the same. In the meantime he would instruct the Agent-General in London to inquire whether steam-whalers would be disposed to embark in the enterprise, and what subsidy would be required.

THE annual meeting of the Association of Swiss Geographica Societies took place at Geneva, at the same time as that of the Society of Natural Sciences. Prof. Chaix was President. Geographical Societies exist now in Geneva, Berne, St. Gall, Aarau, and Neuchatel, and others are about to be established in Zurich, Basle, and Lausanne. Those in existence count altogether more